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Predicting change in psychopathology in youth referred to mental health services in childhood or adolescence

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Background: Little evidence is available on factors associated with persistence and change of psychopathology, and little is known about the predictive value of factors regarding change once problem behaviours exist. This study aims to evaluate change in level of scores of empirically derived problem patterns and to study factors that influence this change for children and adolescents referred to mental health services. **Method:** A referred sample ($N = 1{,}652$), aged 4 to 18 years at initial assessment, was followed up after a mean interval of 6.2 years. We used standardised information from parents, teachers and subjects, including the CBCL, YSR and TRF at both assessments. **Results:** Subjects at follow-up scored significantly above the expected mean norm scores, although for most scores improvement was found. The strongest predicting factor for time 2 psychopathology was the corresponding time 1 score, odds ratios ranging from 1.6 to 21.7. Males and children older at intake improved more than females and younger children, respectively. **Conclusions:** Few child, family and treatment-related factors had additional predictive value over and above earlier psychopathology, and their contribution to the prediction of outcome was small. Findings indicate continuity of behavioural and emotional problems in clinically referred children and adolescents, and these problems should be viewed as chronic conditions. Girls referred for behavioural and emotional problems may form a group especially at risk for poor outcome. **Keywords:** Child Behaviour Check List, continuity, epidemiology, follow-up studies, longitudinal studies, prediction.

Children (we use 'children' to include adolescents) referred for psychiatric services may be at considerable risk for continuation of maladaptive behaviours (Robins, 1966; Otto & Otto, 1978; Kramer, 1980; Zeitlin, 1986). To identify children at risk, longitudinal studies of large, diverse clinical samples are needed to study predicting factors of future problem patterns among referred children, and to determine whether they differ from predicting factors for non-referred children (Stanger, MacDonald, McConaughy, & Achenbach, 1996). Although large investments in time, energy and money are made in mental health services for children, many questions concerning the course and prognosis of psychopathology in referred children can still not be answered based on empirical evidence.

Stability has been shown to be medium to high for a broad range of psychopathology in referred (e.g., Stanger et al., 1996; Heijmens Visser, Van der Ende, Koot, & Verhulst, 1999) as well as non-referred samples (e.g., Koot, 1995; Ferdinand & Verhulst, 1995; Hofstra, Van der Ende, & Verhulst, 2000). Findings on stability do not answer questions about the proportion of children remaining deviant from the time of referral for psychiatric services to later follow-up, nor the proportion of children becoming well adapted.

Stanger et al. (1996) reported strong persistence of Child Behavior Check List (CBCL; Achenbach, 1991a) scores, with odds ratios (ORs) ranging from 2.8 to 10.1. Kramer (1980) reported that problems had disappeared in 50%, improved in 31%, remained the same in 12%, and worsened in 4%; new problems had developed in 25% of the former patients. Other studies indicated persistence of problems, but without presenting proportions of subjects showing change (e.g., Zeitlin, 1986).

Little evidence is available on factors associated with persistence and change. In community samples, factors predictive of poor outcome have been investigated (e.g., Koot, 1995; Verhulst & Van der Ende, 1997). Risk factor and resilience research has shown child and family characteristics to be related to an increased risk of developing problem behaviour, but little is known about the predictive value of factors regarding change once problem behaviours exist (Mathijssen, Koot, & Verhulst, 1999). Available studies (Robins, 1966; Otto & Otto, 1978; Nylander, 1979; Kramer, 1980; Zeitlin, 1986; Rey, Morris-Yates, Singh, Andrews, & Stewart, 1995; Rey, Singh, Morris-Yates, & Andrews, 1997; Stanger et al. 1996; Steinhausen, Meier, & Angst, 1998) show very inconsistent results regarding gender, age, other child characteristics, and family and environmental variables. Results on the predictive value of treatment-related factors are scarce and inconclusive (e.g., Aumiller, Kramer, Leidinger, & Lempp, 1981).

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Robins (1966) followed up 402 children formerly referred to the St Louis child guidance clinic (CGC), after 30 years. The study focused on antisocial behaviours and sociopathic personality. Results included the finding that childhood antisocial behaviour predicted adult antisocial behaviour as well as other undesirable adjustment. At follow-up, 61% of the sociopathic group were still seriously antisocial, while 27% improved (antisocial behaviour markedly reduced) and 12% remitted (had given up their antisocial behaviour). Improvement occurred most commonly between ages 30 and 40. Remission and improvement were partly predicted by having close contact with siblings (increase), and an alcoholic or sociopathic father (decrease). Other predicting factors were: the kind of discipline in the home, the number of siblings, and a history of theft.

Curman and Nylander (1976) and Nylander (1979) published a 10-year and a 20-year follow-up study of children referred to a CGC. Because the number of girls was relatively low, and because girls rarely entered 'asociality registers', these studies are primarily concerned with boys' outcome with respect to officially registered problem behaviours. However, the frequency of application for mental health services steadily dropped with increasing age for boys, whereas for girls the trend was the opposite. After 10 years, 53.8% of the boys and 38.8% of the girls were entered in one of the registers.

At the 10-year follow-up, the authors concluded that background factors do not offer any help in predicting psychiatric complications, but do give some indication of antisocial development. Boys were believed to be more likely to react with symptoms causing disturbances in their surrounding environments, whereas girls more frequently reacted with symptoms more distressing to themselves than to others. At the 20-year follow-up, continuity and poor prognosis of externalising behaviour is suggested, but no figures could be given. The author concluded that background factors did supply indications of the subsequent fate of the children in question. For instance, chronic addicts and hardened criminals came to a very large extent from highly unstable home environments, frequently marked by addiction. Other predicting factors included: being an illegitimate child, being raised by a single mother, school immaturity, and following therapy classes.

For their 17-year follow-up, Otto and Otto (1978) used 371 adolescents visiting the Child and Adolescent Psychiatric Clinic of the Central Hospital in Kristianstad, Sweden in 1955. Otto and Otto concluded that few connections existed between initial cause of referral and later adult 'psychical and somatic behaviour', although they did list a number of associations that can be interpreted as continuity of psychopathology. They also concluded that the outlook is good for children with 'neurotic' problems, in contrast especially to those diagnosed 'character neurotic' (psychopathic). For diverse outcome measures (e.g., social class, criminal records, psychiatric diagnosis and intellectual capacity), they found intellectual capacity, parental social class, home conditions, deviating parents, age at contact, reason for contact and duration of contact to be predicting factors.

In Tübingen (Germany), Aumiller et al. (1981) followed up 1,368 children referred to a department of child and adolescent psychiatry after 8 years. Problems were divided into 5 groupings (school problems, enuresis/encopresis, other behaviour problems, physical problems, and developmental problems/autism/child psychosis). At follow-up, problems had disappeared in 50%, improved or remained the same in 43%, and worsened in 4%. New problems had developed in 25%. This study set out to provide proof of the positive long-term effect of this institute on their population: the existence of the institute, and the counselling and therapy provided, were justified by a 'definite positive relationship' found between improvement or cure and the planned treatment. In his 'Inaugural Dissertation', Kramer (1980) studies the effect of family and social factors, such as family environment, family stress, number of siblings, school situation, social class and frequent parental job changes, on outcome measures. For instance, educational and professional achievement was predicted by previous social problems, educational level and parental job level. Overall predictors of poor outcome were frequent parental job changes, social problems and family stress.

Zeitlin (1986) at Maudsley Hospital, London, England, used case records from child and adult psychiatric departments to obtain information on demographic variables, symptoms, clinic attendance and diagnostic categories. He compared 161 index-patients, who attended both the children's and the adult departments, to all children attending the children's department, but not attending any adult mental health institute. Furthermore, a matched subgroup from the childhood patients not in care in adulthood, and matched adult patients, who had not attended any department of child psychiatry in childhood, were used. In selecting the adult controls, about two-thirds of the rejected cases were excluded because of 'manifest symptoms prior to age 16', in itself a strong indication for continuity of psychopathology. Zeitlin found that formal diagnoses did not help in identifying referred children likely to show disturbance in adult life. Environmental and social factors helped little more, but duration of attendance was correlated with poor outcome. In this study, the continuity of symptoms from childhood to adult life, irrespective of diagnosis, was one of the strongest findings.

Rey et al. (1995, 1997) studied the functioning of a group of adolescent psychiatric patients from the Sydney metropolitan area (Australia) after a mean follow-up interval of 6 years, with an emphasis on

personality disorders. Outcome measures were DSM-III-R diagnoses, regrouping categories 'disruptive' and 'emotional' problems, education achieved, social functioning, psychiatric treatment and judicial problems. Rey et al. concluded that individuals with disruptive disorders in adolescence had a particularly negative personality outcome at young adulthood, with only one gender difference: among men, antisocial personality disorder was more common. Poor overall young adult functioning was predicted by the quality of the family environment and having received treatment.

Stanger et al. (1996) studied an outpatient-clinic sample in Vermont (USA). High stability and continuity for parent-reported syndromes were reported for both younger (5–18 yrs) and older (18–27 yrs) subjects. In the young-adult group, they found that psychopathology was stable across the follow-up period for referred males as well as females and that females failed to improve to the same degree as males.

Steinhausen et al. (1998) compared the outcome – with regard to mortality, delinquency, and adult psychiatric diagnoses – of former patients from the Child and Adolescent Psychiatry Service of the Canton of Zurich (Switzerland) to a large group of controls. Diagnostic categories were created for childhood (internalising, externalising, mixed internalising and externalising, developmental, miscellaneous, subclinical) and adult problems (internalising, externalising, and somatization). No significant differences were found between former patients and controls with regard to mortality or major delinquency, although the latter showed a trend towards higher rates for ex-patients. Former patients did, however, fare less well psychiatrically, showing more externalising disorders, such as sociopathy, drug dependency and sexual delinquency. Significant continuity was found for internalising, but not for externalising disorders. The authors explained this surprising finding by having relatively small numbers of specific types of adult diagnostic categories, i.e., most patients had more than one diagnosis. The type of diagnosis in childhood was not found to be a predictor of adult outcome, but there was some indication that deprived environments, broken homes and parental psychiatric disorders increased the likelihood of poor adult outcome.

The overall impression from these studies is that the level of initial problem behaviour is the strongest predictive factor of later functioning for children referred to mental health services. To measure the contribution of other variables to the prediction of change, analyses should take both the initial level of problem behaviour and the level at follow-up into account.

Only one study investigating a broad range of psychopathology used widely accepted, standardised procedures, with known reliability and validity, which were comparable at initial and follow-up assessment (Stanger et al., 1996). Other studies relied strongly on case-record information assessed in retrospect (Robins, 1966; Otto & Otto, 1978; Nylander, 1979; Zeitlin, 1986; Steinhausen et al., 1998). Furthermore, the studies cited above focused on dissimilar types of psychopathology (e.g., sociopathic personality, 'disruptive' and 'emotional' problems), defined similar predicting factors differently (e.g., broken home, single mother, unstable home environment), and operationalised outcome measures differently (e.g., poor outcome operationalised as personality disorders or registration in 'asociality registers'). These factors reduce comparability and thus hamper the interpretation of results. For instance, no average figures can be given, because different analytic strategies resulted in non-comparable measures (e.g., percentages and stability coefficients).

In the present study, our goals were to determine (a) the change in level of scores of empirically derived problem patterns and (b) factors that influence the change in level of psychopathology. We assessed a sizeable sample of children and adolescents referred to an outpatient psychiatric clinic, using standardised information from parents, teachers and subjects at both times of assessment.

Since the evidence from earlier studies on referred samples is limited, the choice of candidate predictive factors was mainly based on information from studies on community samples. We also included a number of rather crude treatment-related factors. These have, to our knowledge, received little attention so far in studies on the course and prognosis of psychopathology in referred children.

Methods

Subjects

Subjects were 2,441 children, aged 4 to 18, referred to the outpatient clinic of the Academic Hospital Rotterdam – Sophia, Department of Child and Adolescent Psychiatry, between June 1982 and January 1995 (Time 1 [T1]). This department is a university clinic, with specialist child and adolescent psychiatric care.

At follow-up, between June 1995 and June 1997 (Time 2 [T2]), three groups were formed, based on the current age of the subject: young adults (19 years and over, $N = 789$), adolescents (12–18 years, $N = 1{,}288$), and children (11 years and younger, $N = 364$). For further information on eligibility, sample composition and follow-up procedures, see Heijmens Visser et al. (1999).

This study deals only with those aged 4–18 years of age at follow-up ($N = 1{,}652$). The mean length of the follow-up period was 6.2 years (*SD* 2.9). Scorable rating forms were obtained at T2 from at least one informant for 1,286 (77.8%) of the 1,652 eligible subjects. Parent ratings were obtained from 1,263 (76.5%) of the 1,652 parental informants approached, self-ratings from 820 (63.7%) of the 1,288 subjects over 11 years old at Time 2, and teacher ratings for 690 (94.0%) of the 734 subjects who were in school at follow-up and whose parents

granted permission to obtain information from the teacher.

To evaluate the effect of non-participation we compared responders versus non-responders on gender, age at intake, SES (scored on a 9-step scale with 1 lowest and 9 highest, Netherlands Central Bureau of Statistics, 1993), and parent-reported T1 Internalising, Externalising and Total Problem scores. The only significant difference was for gender: information was more often obtained on males than females (79.5% vs. 74.2%, chi-square = 5.7, $df = 1$, $p = .017$).

Instruments

Child Behavior Checklist, Teacher's Report Form, and Youth Self-Report. The Child Behavior Checklist (CBCL), the Teacher's Report Form (TRF), and the Youth Self-Report (YSR) (Achenbach, 1991a, b, c) are standardised reports on children's adaptive functioning, and emotional and behavioural problems in the previous months, as reported by parents or parent surrogates, teachers and adolescents (11–18 years old), respectively. Problem behaviours are scored on syndromes (Withdrawn, Somatic Complaints, Anxious/Depressed, Social Problems, Thought Problems, Attention Problems, Delinquent Behaviour, Aggressive Behaviour) and broadband scales (Internalising, Externalising, Total Problems). For those analyses, in which we needed to categorise subjects as 'deviant' versus 'non-deviant', we dichotomised scale scores at the cut-off points suggested by Achenbach (1991a, b, c), based on Dutch normative scores for each instrument, and for each gender and age-group separately. Good reliability and validity have been demonstrated for the Dutch CBCL, TRF and YSR (Verhulst, Van der Ende, & Koot, 1996, 1997a, b).

Case-record information. At initial contact, mental health workers collected information on subjects as part of the intake procedure. This information was registered on standardised intake forms in case-records, and in letters to referring mental health workers. These case-records, forms, and letters were used to collect the T1 information from.

For this study, 10 raters were trained to collect and code the T1 information in a standardised way. To this end, 15 case-records were coded into 'consensus forms' by experienced researchers. Five were used to familiarise the raters with the procedure (training), after which the remaining 10 case-records were used to establish cross-rater agreement and increase the reliability of coding (by discussing the scores afterwards). For the variables used in this study, raters' scores agreed 96.0% (median) with consensus scores (range 75.4–100%, 14 variables). The reliability of obtaining information was further enhanced by continuous supervision during the actual coding process. Case-records were scored on multiple characteristics with descriptive as well as standardised information.

Coded demographic, family, child and diagnostic/treatment characteristics regarding the period prior to intake were used as factors predicting change (see Table 1). The factor labels are self-explanatory, except for the following. For *ethnicity*, only children born in the Netherlands of Dutch parents were considered as Dutch. *Changes in family composition* were mostly loss of a parent (by separation, divorce or death) or placement in a foster home or in residential care. *Parental psychosocial problems* were scored present when the mental health worker had registered mental health service (MHS) use for either parent, or had clearly indicated that a parent would have benefited from such help (e.g., father alcoholic). A *treatment advice* concerning best possible treatment was given after assessment, and categorised as 'no treatment necessary', 'outpatient treatment required only', or 'in-patient treatment necessary with or without outpatient treatment' (e.g., for parents or family).

Follow-up information. Information on change in family composition and MHS use by subjects and family was obtained from parents, using structured, pre-coded questionnaires. Follow-up information was collected on the period following the last appointment until follow-up. *Change in family composition* was evaluated similar to intake information, and *MHS use* was scored on four factors: subjects had received outpatient treatment or

Table 1 Demographic characteristics, predicting factors and broadband psychopathology outcome with their distribution

Factors		% or mean (SD)
T1 child ($N = 1{,}286$)		
gender	boys	70.5
	girls	29.5
age (yrs.)	boys	*8.4* (2.7)
	girls	*8.6* (2.7)
ethnicity (Dutch versus)	other	7.2
special education	yes	23.2
physical disorder	present	22.2
history of residential MHS[3] use	yes	15.7
psychopathology (CBCL[1])		
Internalising	deviant	74.2
Externalising	deviant	63.8
Total Problems	deviant	80.6
T1 family ($N = 1{,}286$)		
SES[2]		*4.4* (2.1)
change in family composition	yes	27.8
single parent	yes	12.8
only child	yes	15.0
psychosocial problems		
mother	yes	25.7
father	yes	13.1
T1 other (N = 1286)		
treatment advice[4]	outpatient	76.0
	in-patient	19.8
T2 family and treatment ($N = 1{,}256$)		
length of follow-up period (yrs.)		*6.2* (3.0)
change in family composition	yes	36.7
family MHS use in youth	yes	12.7
MHS use in the family	yes	18.5
outpatient treatment	yes	92.1
in-patient treatment	yes	17.2
psychopathology (CBCL[1]) ($N = 1{,}253$)		
Internalising	deviant	52.0
Externalising	deviant	48.4
Total Problems	deviant	56.3

[1] CBCL = scored on the Child Behavior Checklist; [2] SES = socio-economic status; [3] MHS = mental health service; [4] type of advice: no treatment, outpatient treatment only, in-patient treatment.

not, and in-patient treatment or not. For relatives, two factors were considered: MHS use as a child for one of the family members ever, and whether any family member had used MHS during the follow-up period.

Statistical analyses

To investigate the change in level of problem scores, we used repeated measures analyses of variance for each psychopathology score separately, with gender as factor and length of follow-up interval as covariate. Age at intake was included as a covariate where parents and teachers were informants. We tested differences between the mean T2 scores for the referred sample and norm scores obtained in a non-referred gender and age-matched sample (Verhulst et al., 1996, 1997a, b) by using *t*-tests. Cross-tabulations were used to present change from deviant to non-deviant categories (and vice versa) for these scores.

To evaluate the power of different factors in predicting change of psychopathology, we used stepwise logistic regression analyses. In these analyses, the outcome is categorical, i.e., deviant or non-deviant. The outcome is associated with predicting variables, which are introduced in steps (blocks). In our analyses, factors were introduced in three blocks. In the first block, we entered the T1 score corresponding to the T2 score of interest. Thus, influences of other factors were corrected for the T1 score. Therefore, significantly associated factors predict change.

In the second block, factors representing information obtained at initial assessment were added. In testing Internalising and Externalising, Externalising and Internalising scores were added in the second block respectively. In evaluating change in syndromes, the seven remaining syndrome scores were entered in the second block. The other factors in this block were gender, age at intake and length of follow-up interval, ethnicity, special education, physical disorder, SES, T1 change in family composition, living with a single parent, being only child, parental psychosocial problems, and previous in-patient treatment.

The third block consisted of factors representing events occurring after the initial assessment, including treatment advice, change in family composition as reported by parents at follow-up, and MHS use parameters.

Data were missing incidentally from case-records and at follow-up, even after efforts to obtain the information in alternative ways. However, the number of missing values was small (e.g., $N = 30$, for the parent–parent associations). When data were missing incidentally, their values were prorated by the most frequent value of the factor (Table 1). Compared to analyses without prorating, results were very similar, but with higher power for analyses with prorating.

Results

Persistence and change

Table 2 shows mean T1 and T2 scores and their mean differences, as reported by the similar type of informant at both times (e.g., parents at T1 and T2). After dividing scores into 'deviant' and 'non-deviant' categories, we evaluated percentages of individuals scoring in the deviant range at both times, non-deviant at both times, and changing from deviant to non-deviant or vice versa.

Broadband scores. For all broadband scores, change indicating improvement was found. At T2, subjects scored significantly above the expected mean norm scores. According to adult informants, most individuals scoring in the deviant range at T1 still scored as deviant at T2 (on average 63.0% for both parents and teachers). Considerably fewer adolescents reported deviant scores at T1, and more adolescents changed from deviant to non-deviant than remained scoring in the deviant range (on average 59.6%). Across informants, over 60% remained in the same category. Relatively low percentages of scores changing from T1 non-deviant to T2 deviant were found.

Males' scores improved more than females' scores, with only one exception (Internalising reported by parents). Children older at intake improved more on Internalising than younger children. Longer follow-up intervals were associated with more improvement on Externalising.

Syndromes. For each syndrome, except Delinquent Behaviour, change indicating improvement was found. Non-significant changes were found for Withdrawn and Thought Problems (teachers) and Somatic Complaints (adolescents). At T2, subjects scored significantly above the expected mean norm scores. The only exceptions were Somatic Complaints and Aggressive Behaviour scored by adolescents themselves. Change in the percentages of deviant or non-deviant scorers showed that most T1 deviant scorers scored non-deviant at T2 (on average 35.8% remained deviant). Across informants, over 60% remained in the same category. Relatively high percentages of children scoring non-deviant at T1 and deviant at T2 were found, especially for teacher ratings.

Gender affected change in syndromes, males' scores improving significantly more than females' scores on Anxious/Depressed, Social Problems, Thought Problems, Attention Problems and Aggressive Behaviour. Children older at intake improved more than younger children on Somatic Complaints, Anxious/Depressed and Social Problems. Longer follow-up intervals were associated with more improvement in scores on Social Problems and Aggressive Behaviour.

Longitudinal prediction

We computed odds ratios (ORs) for similar informants based on the cross-tabulations of deviant versus non-deviant scores at T1 and T2, corrected for T1 age, gender, and length of follow-up interval. ORs

Table 2 Time 1 (T1) and Time 2 (T2) scores and their difference, for parents (P; $N = 1{,}253$), adolescents themselves (A; $N = 196$), and teachers (T; $N = 546$)

Score[1]	Mean score[2]		difference	Norm score[3]	Percentage of scorers[4]			
	T1	T2			HH	HL	LH	LL
TOTAL PROBLEMS P	56.1^{M}	40.5^{YS}	15.7^{MOL}	18.9	52.0	28.6	4.4	15.1
A	49.6	39.0	10.7^{M}	33.2	18.4	28.6	8.2	44.9
T	52.4^{MY}	42.4^{MY}	10.0^{M}	19.3	46.7	24.9	9.5	18.9
INTERNALISING P	14.6^{O}	11.6^{S}	3.0^{OL}	5.4	43.6	30.5	8.5	17.5
A	15.4	12.1^{F}	3.4^{M}	9.1	18.4	28.6	8.2	44.9
T	13.0^{O}	11.6	1.4^{MO}	5.4	34.2	22.0	14.8	28.9
EXTERNALISING P	18.9^{MY}	13.7^{MYS}	5.2^{ML}	6.4	42.1	21.6	6.3	30.0
A	14.3^{ML}	12.0^{Y}	2.4^{ML}	10.8	14.3	18.9	6.6	60.2
T	16.5^{MYS}	12.5^{MYS}	4.0^{M}	5.5	35.9	21.1	9.0	34.1
Withdrawn P	5.3^{O}	4.1^{Y}	1.2^{OL}	2.0	14.0	27.4	6.1	52.5
A	4.0	3.4^{F}	.6^{M}	2.4	3.1	10.7	6.6	79.6
T	4.8	4.3	n.s.	2.1	8.6	13.6	8.4	69.4
Somatic Complaints P	2.4^{FO}	1.9^{FS}	.5^{O}	1.0	8.0	17.2	8.1	66.8
A	3.7	2.7^{F}	n.s.	2.3$^{\#}$	3.6	12.2	4.1	80.1
T	1.1^{O}	.9^{F}	.2^{O}	.3	3.7	12.1	8.6	75.6
Anxious/Depressed P	7.6^{O}	6.1^{S}	1.5^{OL}	2.6	17.0	25.9	10.9	46.2
A	8.3	6.3^{F}	2.0^{M}	4.4	8.7	18.9	6.6	65.8
T	7.5^{O}	6.8	.7MO	3.0	8.4	15.6	17.0	59.0
Social Problems P	5.1^{MO}	3.8^{YS}	1.3^{MOL}	1.1	23.8	22.3	11.4	42.5
A	4.2^{ML}	3.0	1.2^{ML}	2.5	5.1	18.9	5.1	70.9
T	6.0^{M}	5.2^{Y}	.8^{O}	1.8	12.6	15.8	16.8	54.8
Thought Problems P	2.4^{MS}	1.6^{YS}	.7MO	.4	14.8	21.3	9.7	54.2
A	2.7	1.7^{FY}	1.0^{M}	1.2	4.6	16.8	5.6	73.0
T	2.0^{Y}	1.8	n.s.	.4	13.9	16.1	21.4	48.5
Attention Problems P	9.2^{M}	6.9^{MYS}	2.3^{MOL}	3.2	27.9	27.9	8.7	35.4
A	6.5^{M}	5.4	1.1^{M}	4.7	5.1	13.3	2.6	79.1
T	16.1^{MY}	12.8^{MY}	3.4^{M}	6.8	12.3	18.5	10.8	58.4
Delinquent Behaviour P	3.4^{MO}	3.2^{M}	n.s.	1.4	16.8	21.3	7.2	54.7
A	3.9^{M}	3.9	n.s.	3.4	2.0	6.1	7.1	84.7
T	1.9^{M}	2.0^{M}	.1^{L}	.8	6.6	9.3	10.3	73.8
Aggressive Behaviour P	15.5^{MY}	10.5^{MYS}	5.1^{ML}	5.0	24.7	21.9	5.2	48.3
A	10.5^{ML}	8.1^{Y}	2.4^{ML}	7.4$^{\#}$	6.6	14.3	3.1	76.0
T	14.6^{MYS}	10.5^{MYS}	4.0^{M}	4.6	14.3	20.0	6.2	59.5

[1] P = parent, A = adolescent, T = teacher; [2] differences between T1 and T2 scores: n.s. = non-significant; [3] mean scores in norm population, weighted for T2-age and gender: [#] not significantly different from T2 score; [4] percentages scorers: HH = above cut-off point at both times, HL = above cut-off at T1, below at T2, LH = below cut-off at T1, above at T2, LL = below cut-off at both times; [M] males score higher than females; [F] females score higher than males; [Y] younger subjects score higher; [O] older subjects score higher; [S] subjects with shorter follow-up intervals score higher; [L] subjects with longer follow-up intervals score higher.

for broadband scores ranged from 3.0 (Internalising scored by teachers at both times) to 9.3 (Externalising scored by parents at both times). ORs for syndrome scores ranged from 1.9 (Anxious/Depressed scored by teachers at both times) to 17.3 (Attention Problems scored by adolescents themselves at both times). Since results were very similar to values found in the multivariate analyses presented in Tables 3 and 4, they are not presented in detail.

Tables 3 and 4 show, for similar T1 and T2 informants, predictive relations between categorical T1 problem scores and the corresponding T2 scores, evaluating other factors as well, for broadband scores (Table 3) and syndromes (Table 4). Only significant effects are shown.

Broadband scores. Analyses showed that the strongest predicting factor was the T1 score predicting the corresponding T2 score. For instance, in all cases T1 Internalising was the strongest predicting factor of T2 Internalising scores. ORs ranged from 2.8 to 8.1.

Values found for other factors can be considered corrected for this 'continuity effect', i.e., the other factors add significant predictive value over and above the predictive value of the corresponding T1 score. For instance, individuals scored (by parents) in the deviant range of the T1 Externalising scores have a 1.6 times higher probability of scoring in the deviant range of T2 Internalising than those who do not, regardless of the effect of T1 Internalising. No other effects from Internalising to Externalising or vice versa were found.

Syndromes. The strongest predicting factor in each analysis was the T1 score predicting the corresponding T2 score. ORs ranged from 1.6 (Thought Problems as reported by teachers) to 21.7 (Attention Problems reported by adolescents themselves). Results were very similar across syndromes. ORs

Table 3 Prediction by risk factors (odds ratios, or e^B): deviant broadband scores as scored by parents (P), adolescents (A), or teachers (T) at both times

	T2 psychopathology[1]								
	Total Problems			Internalising			Externalising		
Predicting factors	P	A	T	P	A	T	P	A	T
T1 psychopathology									
Total Problems	*5.8*	*4.1*	*2.9*	X[4]	X[4]	X[4]	X[4]	X[4]	X[4]
Internalising	X[4]	X[4]	X[4]	*2.8*	*4.2*	*2.8*			
Externalising	X[4]	X[4]	X[4]	1.6			*8.1*	*7.0*	*5.7*
Demographic factors									
gender					2.2				
age at intake	.88			.89			.92		
SES[2]						.89	.93		
ethnicity				1.8			1.8		
length of follow-up period	.84			.86			.90		
T1 assessment factors									
special education	2.0		2.1	1.6			1.4		1.6
physical disorder							.72		
change in family composition									1.8
history of residential MHS[3] use			2.0						
Post-intake factors									
treatment advice									
no treatment vs. outpatient treatment		.47							
change in family composition	1.6			1.4			1.6		
outpatient treatment	2.5						2.5		
in-patient treatment	3.1		2.0	2.1		2.0	2.2		2.3

[1] P = parent, A = adolescent, T = teacher; [2] Socio-economic status; [3] Mental Health Service; [4] X = factor not included in this analyses. Only significant effects are shown.

generally ranged from 2 to 4; ORs for Aggressive Behaviour ranged from 6.0 to 7.8 (Table 4).

For some syndromes, syndromes other than the corresponding T1 syndromes or other factors were the strongest predicting factor. For T2 Delinquent Behaviour reported by parents and adolescents, T1 Aggressive Behaviour was the stronger predicting factor. Having had special education prior to intake was the stronger predicting factor for T2 Attention Problems scored by teachers. For T2 Somatic Complaints and Thought Problems as reported by adolescents, gender and Delinquent Behaviour were the stronger predicting factors, respectively.

Other predicting factors. Gender was not consistently related to outcomes, whereas age at intake and length of follow-up interval were, as far as parent-reported scores were concerned. Age at intake, length of follow-up interval, and SES were included as continuous factors.

Ethnicity was a predicting factor as far as parent-reported problems were concerned: higher risks on Internalising and Externalising were found for children not born in the Netherlands and/or born to at least one non-Dutch parent. Other important predicting factors were being in the special education system (T2 Total Problems, Externalising, and Social Problems), having a history of in-patient care at intake, change in family composition reported at intake (T2 Delinquent Behaviour), maternal psychosocial problems reported at intake (T2 Withdrawn and Delinquent Behaviour), change in family composition during the follow-up period, and receiving in-patient care during the follow-up period. Very few significant predicting factors were found for scores reported by adolescents themselves, which was most likely due to the smaller power ($N = 191$) for these analyses.

Discussion

Referred children fared considerably worse at follow-up across a mean interval of 6.2 years compared to a normative sample of similar age and gender, although an overall improvement on mean scores was found. For broadband scores, according to parents and teachers 63.0% of the T1 high scorers still scored as deviant at T2; adolescents reported that 40.4% scored as deviant at both times of assessment. For syndrome scores, 35.8% of the T1 high scorers scored as deviant at T2. These results were very similar for different types of psychopathology. Across informants, over 60% of the children remained in the same category (i.e., those scoring in the deviant or non-deviant range at both times) for broadband as well as syndrome scores. Furthermore, in predicting different types of problems at follow-up, similar problems earlier in childhood or adolescence were the strongest predictive factors in most analyses, indicating the chronic nature of specific types of psychopathology.

Table 4 Prediction by risk factors (odds ratios, or e^B): deviant problem scores as scored by parents (P), adolescents (A), or teachers (T) at both times

	T2 psychopathology[1]																							
	Withdrawn			Somatic Complaints			Anxious/ Depressed			Social Problems			Thought Problems			Attention Problems			Delinquent Behaviour			Aggressive Behaviour		
Predicting factors	P	A	T	P	A	T	P	A	T	P	A	T	P	A	T	P	A	T	P	A	T	P	A	T
T1 Psychopathology																								
Withdrawn	*4.2*	*4.0*	*5.5*																					
Somatic Complaints				*3.4*	*5.5*	*2.7*													.56					
Anxious/Depressed				1.6			*2.1*	*4.4*	*1.7*							.59		.56						
Social Problems	1.5				3.6		1.4			*4.1*	*3.6*	*2.1*				1.7						3.2		
Thought Problems							1.8			1.4			*2.8*	*3.3*	*1.6*	1.5								
Attention Problems													1.5			*2.6*	*21.7*	*2.7*				1.5		
Delinquent Behaviour														17.2		1.5		2.4	*3.0*		*2.5*	2.0		
Aggressive Behaviour												1.7			1.7			1.9	3.4	5.9	2.3	*6.2*	*7.8*	*6.0*
Demographic factors																								
gender			1.9		6.2															3.3				
age at intake	.88						.88			.84			.89			.88								
length of follow-up period	.89			.93			.89			.90			.92			.92			.93			.93		
T1 assessment factors																								
special education										1.6		2.0						3.1					4.1	
physical disorder				1.7																				
psychosocial problems mother		2.8	1.8																1.6					
change in family composition																			1.8		2.1			1.9
history of MHS[2] use										1.7			1.5			1.5						1.9		
Post-intake factors																								
treatment advice																								
no treatment vs. outpatient treatment												.65					.34							
change in family composition	1.7						1.8						1.6		.52	1.5								
family MHS use in youth										.66														
in-patient treatment				1.6					1.7	1.7			2.0		3.3	1.7			2.3		2.7	2.0		2.3

[1] P = parent, A = adolescent, T = teacher; [2] Mental Health Service. Only significant effects are shown.

Few child, family and treatment-related factors were found to have predictive value over and above earlier psychopathology, and their contribution to the prediction of outcome was small. This may indicate that predictive factors mainly influence T1 problem behaviours, and that once problem behaviours exist, risk (and resilience) factors have little influence on the degree of change.

Ethnicity was a predictive factor of psychopathology reported by parents: higher risks on broadband scores were found for children not born in the Netherlands and/or born to at least one non-Dutch parent. However, this effect was eliminated for prediction of Total Problems when information about factors occurring during the follow-up interval was added.

Gender was a factor affecting change on most scales according to all informants, in that males' scores improved more than females' scores. This seems in contrast with the higher referral rates for boys than girls. An explanation for this gender-paradox may be that girls must display higher levels of problem behaviours to be referred to mental health services. However, data generally did not show higher T1 scores for females than for males. Since higher scores indicate more different symptoms within a syndrome, the explanation may be that females display similar amounts of symptoms more frequently or more seriously, and therefore form a group especially at risk for poor outcome.

Children older at intake improved more on most scales than younger children, and longer follow-up intervals were associated with more improvement on all scales. This may indicate that psychopathology presenting earlier in life is more serious, or that psychopathology presenting itself later in life has less influence on development and therefore is more accessible to improvement over time.

Our findings also showed that children who are in schools for special education at intake are at increased risk for poor outcome, especially regarding externalising and overall problem scores. Because we included the level of behavioural problems in the analyses, the learning disabilities experienced by these children should be considered a separate, significant predictor of poor outcome. From our data, we cannot conclude what the significance of this factor is, i.e., whether it is a risk factor in itself, or an indicator of an underlying cause (e.g., a specific neurobiological deficit).

Children with a history of mental health service use at intake or obtaining in-patient treatment at follow-up fare worse later, indicating that those children receiving help at multiple points in time are probably the children with the most severe and most chronic problems. This is in agreement with Verhulst and Van der Ende (1997) who concluded that mental health professionals devote their time predominantly to children (and families) who need it most. However, it also shows that we are far from having an adequate strategy to prevent or treat these problems.

Improvement was found for the majority of scales except for Delinquent Behaviour, which only showed improvement when taking the categorical data into consideration. The stability of delinquency is well documented (e.g., Robins, 1966, Loeber & Farrington, 1994). Although similar percentages of children as with other syndromes improve or start to show delinquent behaviour during follow-up, the children remaining delinquent obtain higher scores, resulting in comparable levels of scores at initial and follow-up assessment. This explanation is supported by the finding that longer follow-up intervals indicated higher scores on teacher reported Delinquent Behaviour in the present study.

A clue to the identification of children with high probability of persistent delinquent behaviour is suggested by our results: high levels of delinquent behaviour at follow-up are best predicted by aggressive behaviour at intake. In particular, children displaying both delinquent and aggressive behaviours at intake are at an increased risk of high levels of delinquent behaviour at follow-up. Another factor consistently predicting delinquent behaviour was having had a change in family composition before intake.

Limitations

Although an overall response rate of 77.8% was reached, self-ratings were obtained for 820 out of a total of 1,652 subjects, and teacher ratings for 690 subjects. Self-ratings on the present instruments can only be obtained from subjects over 10 years old. For information from teachers, we needed permission from parents and, over 10 years old, from subjects themselves. The self- and teacher-reported information is therefore gathered from specific subgroups, a (possible) selection bias. However, with these limitations in mind, we feel numbers are sufficiently large to provide relevant and valuable information.

This study was not designed to determine treatment effect, although most children in this sample were treated. Therefore, it is difficult to determine what part, if any, of the improvement is attributable to spontaneous recovery, treatment, or – for that matter – statistical effects, such as regression-to-the-mean. That the latter would be the only explaining factor is contradicted by consistent findings, such as improvement being larger for males than for females, which was found regardless of the difference in level – initially and at follow-up. The odds ratios reflecting concordance between T1 and T2 parent-reported scores were comparable to results found by Stanger et al. (1996). This further reduces the probability that our results reflect chance findings, and indicates that results may be generalised to populations from other outpatient clinics.

Most limitations of the present study are shared by similar studies: attrition bias, selection bias, a

one-clinic sample, and a widely varying follow-up interval. Furthermore, only a limited number of predictive factors were assessed using standardised measures. Another limitation concerns the different operationalisation and use of predictive factors across studies. In our study, we used predictive factors spanning the history at intake and the follow-up period in one analysis, an approach not used in earlier research. We feel this approach may improve insight into the underlying mechanisms, and may help develop treatment and preventive measures, and identify children with poor versus good prognosis.

Clinical implications

It is sobering to find that a large proportion of children referred to mental health services still show problematic behaviours across a six-year follow-up period on average. However, these findings should be a challenge to mental healthcare professionals to increase their efforts to improve prevention, early identification, and treatment statistics.

From our findings, a number of subgroups of children referred to mental health services may be identified, who may need special attention because they are most at risk for a poor prognosis. These are children with both delinquent and aggressive behaviours; with learning disabilities; from one-parent families; from ethnic minorities; and with female gender.

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